

Serial No. 09/944,150

Attorney Docket No. 12-006

LISTING OF CLAIMS:

1.-19. (Canceled)

20. (Currently amended) A porous film composed of a modified polymer material for a non-aqueous electrolyte secondary battery,

wherein:

the modified polymer material is at least one material selected from the group consisting of polybenzimidazole, polyimide, polyether imide, polyamide imide, polyphenylene sulfide, polyether sulfone, polysulfone, polyether ether ketone, polymethyl pentene, aramide, polyvinylidene fluoride, polyamide, polyethylene terephthalate, polybutylene terephthalate, polyethylene naphthalate, polybutylene naphthalate, polyarylate, polyacetal, polyphenylene ether, and derivatives thereof;

the modified polymer material has a backbone chain; and

at least a portion of the modified polymer material is modified by a first modifier, the first modifier having at least two successive carbon atoms bonded to carbon atoms of the backbone chain and having a predetermined substituent different from the functional group of the modified polymer material, ~~wherein said predetermined substituent is bonded to a second modifier having a SiOSi structure.~~

wherein:

the first modifier is composed of a compound having an unsaturated multiple bond in the molecule thereof;

a LUMO energy of the first modifier is not less than 0.3 eV when hydrogen atoms are added to the unsaturated multiple bond; and

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a protective layer induced from the first modifier is formed on the surface of the modified polymer material by bonding the unsaturated multiple bond of the first modifier to the carbon atoms of the backbone chain.

21. (Canceled)

22. (Canceled)

23. (Currently amended) The porous film composed of the modified polymer material for the non-aqueous electrolyte secondary battery, according to ~~claim 21~~claim 20,

wherein said first modifier is selected from the group consisting of ethylene glycol dimethacrylate, trimethylolpropane trimethacrylate, cyclohexyl methacrylate, octafluoro pentyl acrylate, octafluoro pentyl methacrylate, tetrafluoro propyl acrylate, tetrafluoro propyl methacrylate, vinyltris (β -methoxy ethoxy) silane, vinyl triethoxy silane, vinyltrimethoxy silane, γ -(acryloxy propyl) trimethoxy silane, γ -(methacryloxy propyl) trimethoxy silane, γ -(acryloxy propyl) triethoxy silane, and γ -(methacryloxy propyl) triethoxy silane.

24. (Withdrawn) The porous film composed of the modified polymer material for the non-aqueous electrolyte secondary battery, according to claim 20,

wherein:

the first modifier is composed of a compound having an unsaturated multiple bond in the molecule thereof;

a HOMO energy of the first modifier is not more than -10.1 eV when hydrogen atoms are added to the unsaturated multiple bond; and

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a protective layer induced from the first modifier is formed on the surface of the modified polymer material by bonding the unsaturated multiple bond of the first modifier to the carbon atoms of the backbone chain.

25. (Canceled)

26. (Withdrawn) The porous film composed of the modified polymer material for the non-aqueous electrolyte secondary battery, according to claim 24,

wherein said first modifier is selected from the group consisting of ethylene glycol dimethacrylate, trimethylol propane trimethacrylate, cyclohexyl methacrylate, octafluoro pentyl acrylate, octafluoro pentyl methacrylate, tetrafluoro propyl acrylate, tetrafluoro propyl methacrylate, heptadecafluoro decylacrylate, heptadecafluoro decylmethacrylate, vinyltris (β -methoxy ethoxy) silane, vinyl triethoxy silane, vinyltrimethoxy silane, γ -(acryloxy propyl) trimethoxy silane, and γ -(acryloxy propyl) triethoxy silane.

27. (Previously presented) The porous film composed of the modified polymer material for the non-aqueous electrolyte secondary battery, according to claim 20,

wherein said predetermined substituent has a -SiOSi- structure.

28. (Withdrawn) The porous film composed of the polymer material for the non-aqueous electrolyte secondary battery, according to claim 20,

wherein said predetermined substituent is bonded to a second modifier having a -SiOSi- structure.

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29. - 31. (Canceled)